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Target Behavioral Response Laboratory

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The TBRL Mission



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- We test PEOPLE!
 - We don't test the functionality of a device, we test the human response and the changes in performance when that device is used on human targets.
- We are looking for TACTICALLY RELEVANT results
 - A brain wave spike or an eye twitch are irrelevant if an SVBIED driver just keeps on driving
- We always endeavor to use what the soldier wants as the primary metric
 - If you want to keep people away, measure the distance of how close people get when you target them with the device being evaluated.



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The TBRL Mission



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The evaluation of system effectiveness of any device designed to target people, groups, or crowds. Such devices include non lethal systems, less-than-lethal systems, lethality enablers, and sensors

- Evaluation of devices
 - COTS
 - Prototypes
- Effectiveness research
 - New technologies
 - Concepts
 - Tactics, Techniques, and Procedures (TTPs)
- Compilation of empirical data for use in M & S



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Current Areas for Research and Experimentation



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- Convoy Protection
 - Tactical Suppression and Non-lethal Capabilities
 - Combatants and Non-combatants
- Room Clearing
 - Currently with entry
 - Without entry in the future
- Crowd Management
 - Identifying situations and establishing control
 - Escalation of force
- Checkpoint and Site Protection
 - Tactical Checkpoint
 - Entry Control Point
- Stress Management in Training and Operations
 - Minimize Blue force stress to enhance performance
 - Maximize Red force stress to interfere with performance



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The Five Components of TBRL Capabilities



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1. Indoor and outdoor testbeds configured and maintained for experimentation to include:
 - Controlled, high fidelity areas
 - Operationally-relevant, scenario dependent areas
2. Equipment, both hardware and software, required for operation, data collection and analysis
3. Safety and environmental procedures with approvals required to permit experimentation
4. ARDEC Institutional Review Board
5. Trained staff to Develop, Conduct and Report on Human Research
 - Credentialed research scientists serving as Principal Investigators
 - Mechanical, electrical and biomedical engineers
 - Human Research Technicians



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Indoor Testbeds



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- The Testbeds inside our Building include:
 - **Indoor Dismounted Infantry Survivability & Lethality Test-bed**
 - Simulated firing of all small arms, M9 through MK19 including recoil in computer generated 3D scenarios. Records all ballistic data including continuous aim point tracking. Also instrumented to control various light stimuli.
 - **Indoor Non-Lethal Firing Range**
 - 50m indoor range for test and evaluation of non-lethal and less than lethal weapon systems. Flip targets available. Can be instrumented to control targets and weapon firing, safety etc. Range can be extended with firing position extended from outdoors through the bay door.
 - **Indoor Crowd Control Test-bed**
 - 6,400 square foot arena. Matting and cushioned obstacles available. Overhead grid for cameras, lights and other instrumentation. Data is gathered via a VICON motion capture system.
 - **Indoor Target Discrimination Test-bed**
 - 32x28 foot enclosed room with roof and one door. Sealed and ventilated for use of obscurants.
 - **Indoor Room Entry Test-bed**
 - 16x16 foot room with two doorways. Flip targets available. Fully instrumented to control targets, light and sound stimuli and record trigger pulls. VICON motion-capture system.



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Outdoor Testbeds



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- The Testbeds outside our Building include:
 - **Outdoor Convoy Protection Test-bed**
 - 1 mile or 1½ mile routes over a combination of 2 lane paved, 1 lane unpaved roads and dirt trails through urban and wooded areas. Numerous OPFOR positions available in open and wooded areas with ranges out to 500 meters off route.
 - **Outdoor Tactical Checkpoint Test-bed at heliport**
 - 250 meter strip of concrete roadway with lightweight jersey barriers. Test vehicle outfitted with silhouette target, instrumentation and computer to record energy on target, video and other data.
 - **Outdoor Building Entry Test-bed**
 - 25x90 foot building with 10 rooms and multiple doors. Various furniture including chem/bio lab. Day and IR cameras available.
 - **Outdoor Crowd Control Test-bed**
 - 70x25 meter open area. Barriers available. Camo-Net sets available for shade.



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Academic Collaborations



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- Stress and Motivated Behavior Institute (SMBI)
 - Formed within the New Jersey Medical School (NJMS) through a collaboration with the ARDEC TBRL
 - Affiliated with the Neurobehavioral Research Lab (NRL) of the Veteran's Administration Health Care System of New Jersey at East Orange
- Provides a variety of academic resources in highly specialized areas
 - Subject Matter Experts for consultation on experimental design and execution
 - Scientific Review of Institutional Review Board protocols
- Collaborative research efforts
 - Stress in Training
 - Sound Safety Experimentation
 - Tactical Fog effectiveness and safety experimentation



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Use of Effectiveness Data



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- The data is used to:
 - Create Models of Human Behavior in Response to Non-lethal Weapons
 - Validate the models developed for simulations of human behavior
 - Provide potential effectiveness data for use in Analysis of Alternatives before program decisions are made
 - Develop “testable” requirements early in program for use throughout the development
 - Provide data for legal and treaty reviews
 - Provide design details needed to ensure effectiveness to system developers
 - Evaluate the performance of the devices and TTPs as the systems mature



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